**Project: Automatic assessment of the degradation of bio-plastic particles using fluorescence flow-cytometry**

***Goal***

The goal of the project is to analyze the obtained research data from flow-cytometry and develop with machine learning an analysis pipeline that can distinguish PHBV particles from bacteria, and that subsequently extracts a numeric measure of how much the plastic particles in a sample have degraded.

A Future goal is to determine which types of bacteria are most effective at degrading bioplastics, and under which conditions this best occurs.

***Flow-cytometry***

Flow-cytometry is a technique to detect and measure psychical and chemical characteristics of cells or particles. It measures forward and sideward scattering light. Bacteria or plastics flow through a microscopically narrow tube and pass through a laser beam. The strength and ratios of the scattered light intensities can be used to assess the nature and characteristics of cell/particles.

***PHBV***

Bioplastic are polymers produced by micro-organisms. An example of a bioplastic is PHBV. PHBV is short for Poly(3-hydroxybutyrate-co-3-hydroxyvalerate). PHBV is a thermoplastic polymer, which is:

* Brittle
* Low elongation at break
* Low impact resistance

The applications for PHBV are:

* Controlled release of drugs
* Medical implants and repairs
* Specialty packaging
* Orthopedic devices

PHBV is also bio-degradable which can be used as an alternative to non-biodegradable plastics. And it is renewable. But is has it drawbacks. It is expensive to make and has a low thermal stability.